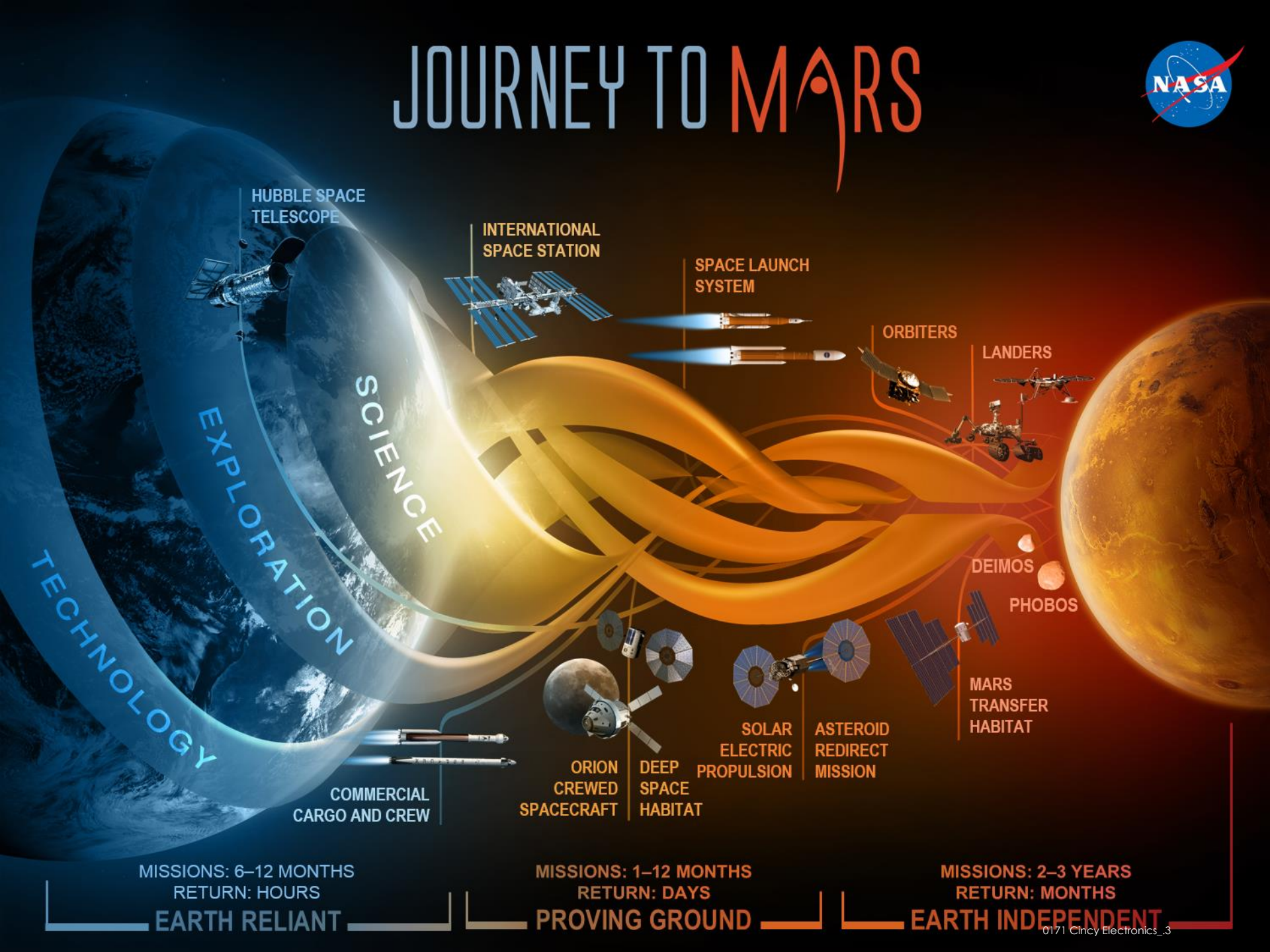
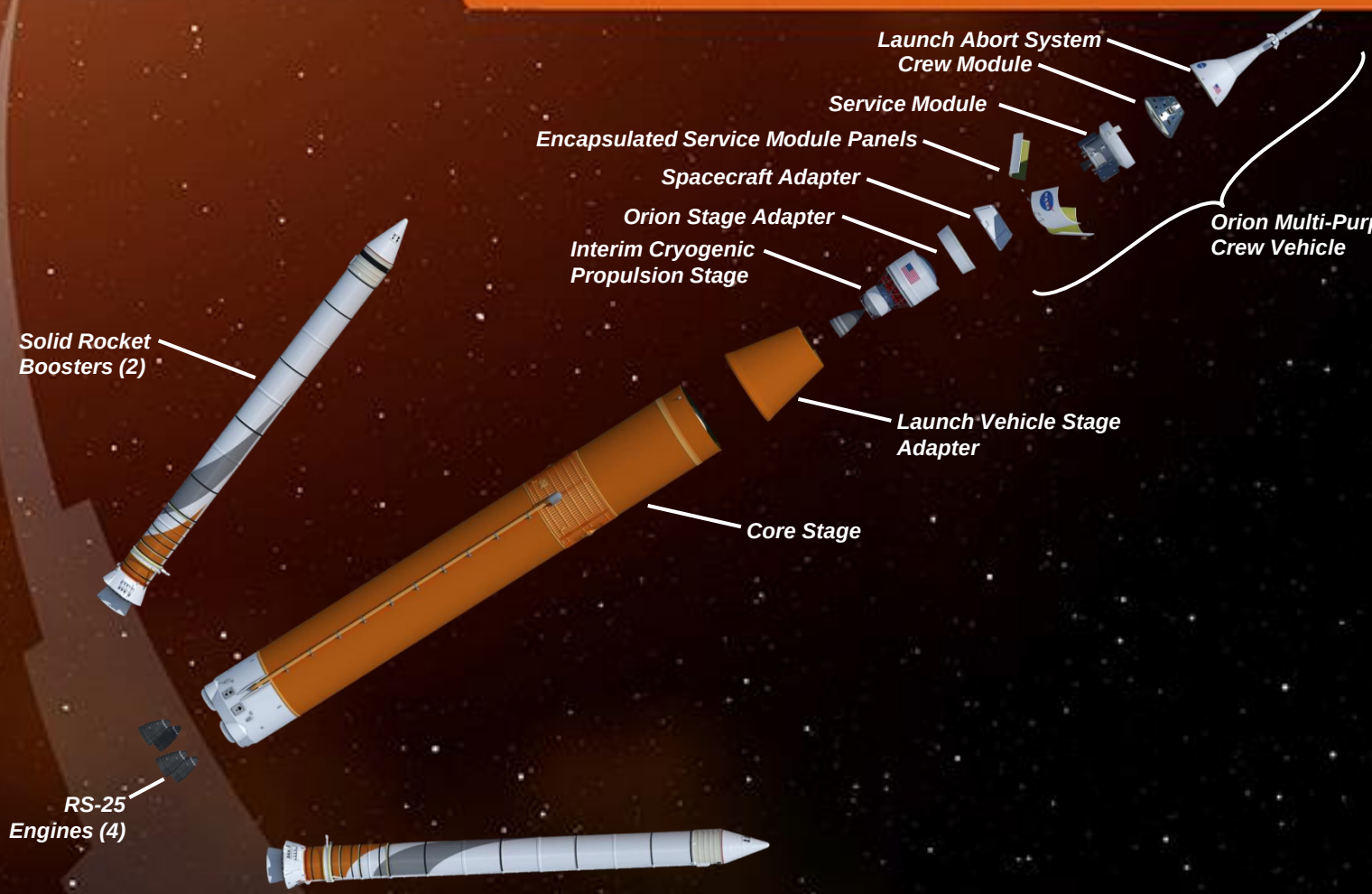

National Aeronautics and Space Administration
NASA
5 . . . 4 . . . 3 . . . 2 . . . 1 . . .
SPACE LAUNCH SYSTEM
SLS Boosters and Qualification Motor – 2 (QM-2)
Bruce Tiller
June 21, 2016
SLS
www.nasa.gov/sls

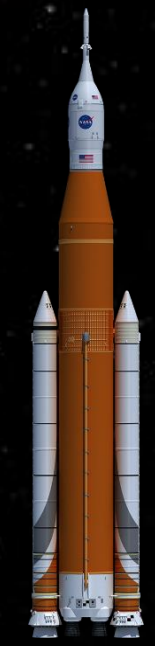
Agenda

- SLS Overview – Enabling Deep Space Exploration
- Booster Overview – The Power at Liftoff
- QM-2 Overview – Qualification Test for Flight



SLS BLOCK 1 CREW VEHICLE





SLS Block 1 Crew

NASA's Space Launch System is an advanced, heavy-lift launch vehicle which will provide an entirely new capability for science and human exploration beyond Earth's orbit.

SLS SPACE LAUNCH SYSTEM

www.nasa.gov/sls

Exploration Mission-1

EM-1 mission will launch Orion atop the SLS rocket from KSC in 2018. The uncrewed Orion will travel into a retrograde lunar orbit, breaking the distance record reached by the most remote Apollo spacecraft. The mission is 22 days and tests system readiness for future crewed operations.

SLS Vehicle Assembly

RS25 Engines at Stennis Space Center

Core Stage at Michoud Assembly Facility (MAF)

Engines/Core Stage travel to KSC by Pegasus Barge

Five-segment SRM in Utah

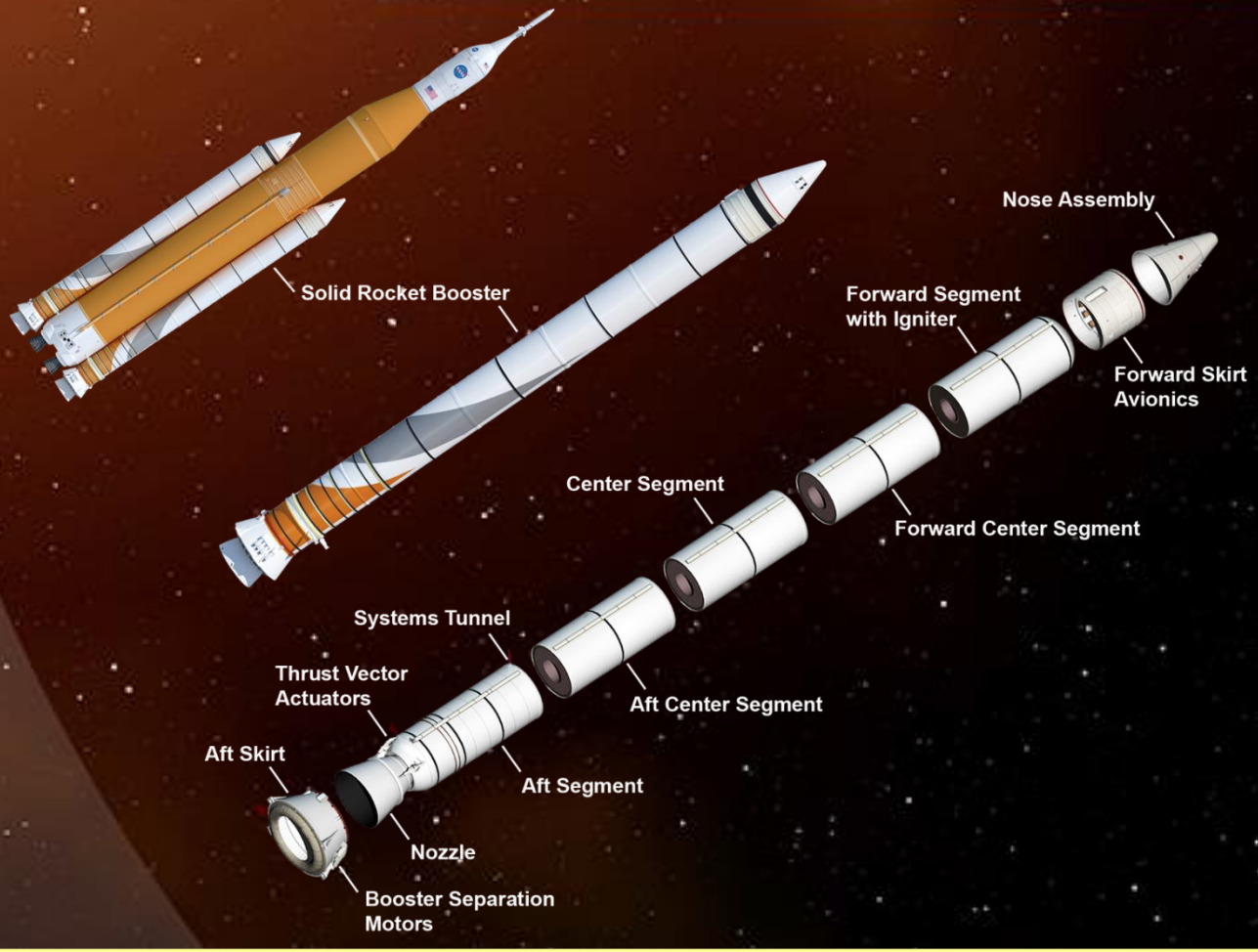
Motor segments on train from Utah to KSC

Vehicle stacking in VAB

The SLS Vehicle is assembled at KSC after major elements arrive via train and barge.

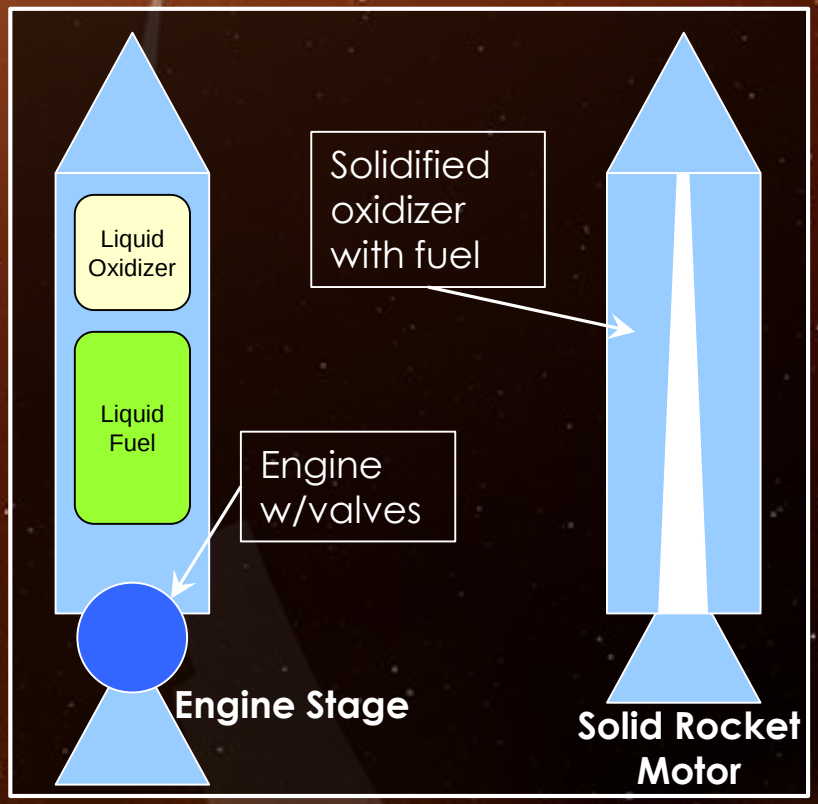
Stacked vehicle rolls out on Mobile Launcher

SLS FIVE-SEGMENT BOOSTERS



The SLS Boosters burn for approximately two minutes prior to separation. During that time, the boosters provide more than 75% of the thrust required to escape the Earth's gravity. Each booster is composed of three assemblies: aft, motor, forward.

Solid Rocket Motor Basics



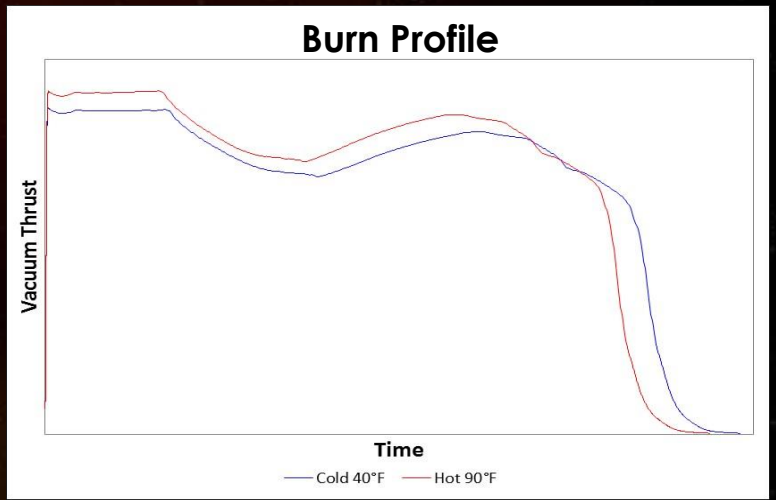
SRMs provide capability to a wide range of applications, including launch vehicles, strategic defense, and tactical defense.

A solid rocket motor is analogous to a liquid rocket engine with tanks. It's a case filled with a mixture of fuel and oxidizer suspended in a rubber binder to maintain its shape. SRM's also include control avionics and often steering controls and flight safety systems. SRMs are used when high thrust, long term storage, or rapid readiness are needed.

Purpose of Hot and Cold Static Tests

QM-1 was successfully static test in March 2015 at 90 degrees F.

Refrigeration units brought in to cool motor to 40 degrees F.



Temperature effects Performance. Ground test plus analysis quantify effect

QM-1 was at 90 deg F. QM-2 will be at 40 deg F. That covers the range we expect to see on launch day in Florida.

Qualification Motor – 2 Overview

Delivery of the QM-2 aft segment and aft skirt to test stand

QM-2 insulation layup process.

Test stand controls

QM-2 is the second qualification test and fifth ground test.

Test objectives include ballistic and insulation performance, nozzle plug behavior, loads, etc.

QM-2 will demonstrate 82 Qualification objectives through 537 instrumentation channels.

Motor Build-up and Test

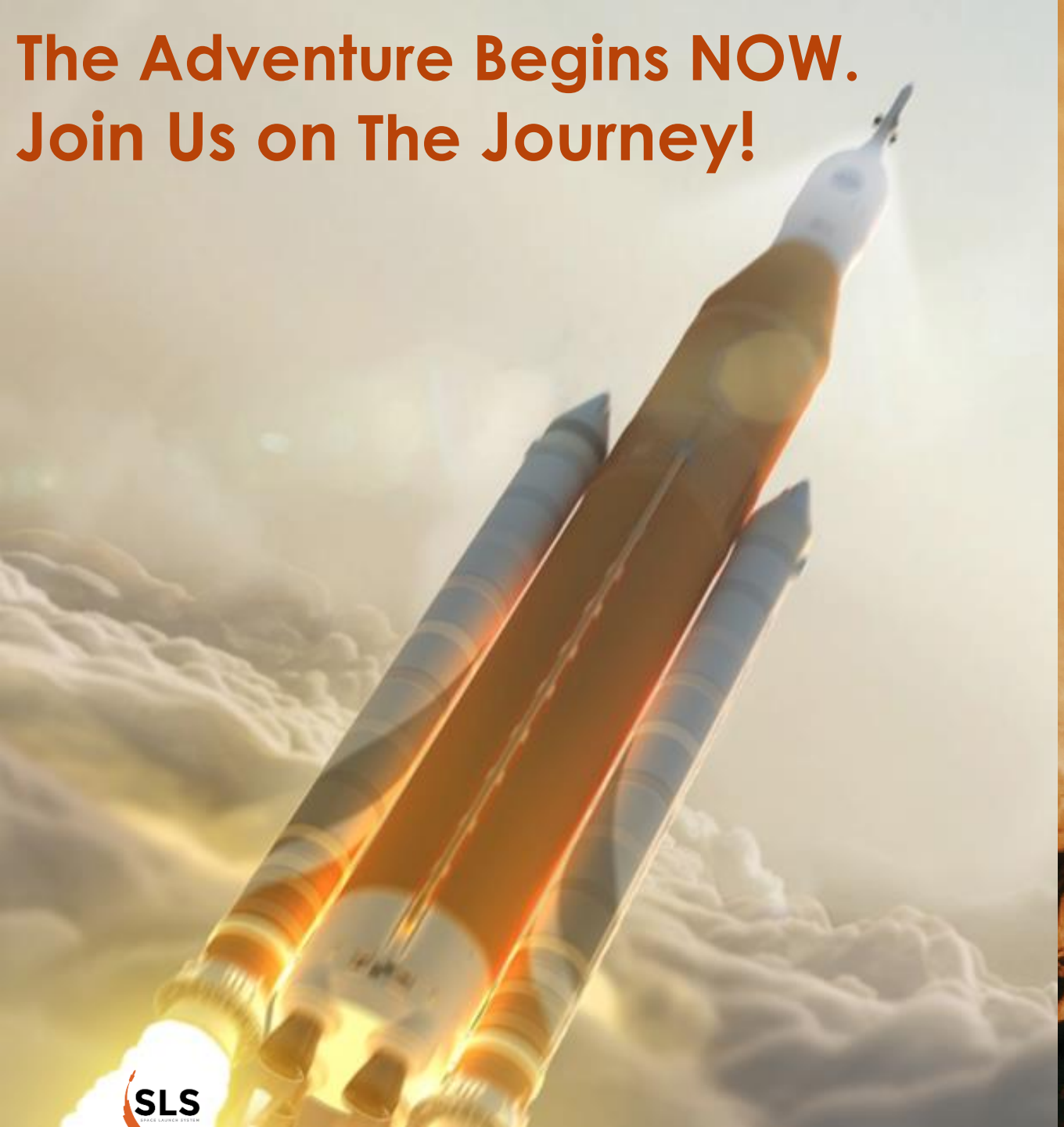
Assembly of Static Motor for Test

QM-1 Test

QM-2 Static Test Information

- Date: June 28, 2016
- Time: 8:05 a.m. Mountain Daylight Time
- Location: Orbital ATK Test Facility in Promontory, UT
- Live Media Coverage begins at 7:30 a.m. MDT on NASA TV

The Adventure Begins NOW.
Join Us on The Journey!



#JOURNEYTOMARS

www.nasa.gov

@NASA_SLS

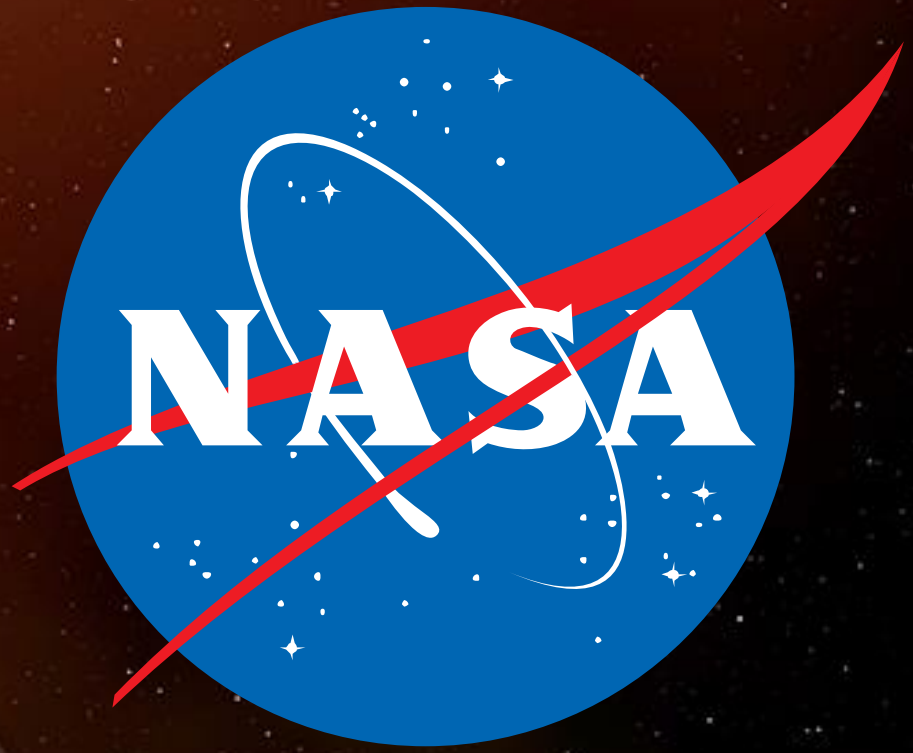
NASASLS

google.com/+nasa

youtube.com/nasa

@explorenasa

Questions



www.nasa.gov/marshall